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Progress Report

TESTS OF REFRIGERATION AND MISCELLANEOUS EQUIPMENT

January 1 to March 31, 1953

by

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NBS

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Warehouse Units (1/3 ton)

A series of tests of two 1/3 ton gasoline-driven warehouse refrigerating units was begun to determine the range of capacities available by varying the compressor speed from 1800 to 3000 rpm, both while holding the fan speed constant at design speed and while varying the fan speed in proportion to the compressor speed.

One of the two 1/3 ton units being used for this series of tests is a Thermo King Model 0150 and the other is a Carrier Model D731-9644.

The tests of the Carrier unit were completed for a range of compressor speeds while the evaporator fan was driven at constant speed by the electric motor normally furnished as a part of the unit. The tests of the Thermo King unit were completed for a range of compressor speeds with the evaporator fan belt-driven from the engine. Tests with constant evaporator fan speed are yet to be made.

A 1/2 ton unit manufactured by The U. S. Thermo Control has been received for an extension of this series to include the larger size.

"Drifreez" Refrigerant Dryer

Tests of the "Drifreez" calcium-carbide refrigerant dehydrator were completed during this quarter.

The manufacturer has redesigned the product at least twice during the period of tests and has submitted one modification since the completion of the tests, apparently in order to correct deficient areas of performance.

Reports of the various phases of this project are being prepared. In addition to determining the relative value of this product as a dehydrator, the question of whether the acetylene-producing characteristic of the desiccant, calcium-carbide, made the use of the product hazardous was investigated. The possible hazard was that an explosion might occur, either through the decomposition of acetylene, the ignition of acetylene-air mixtures, or the self-igniting explosions of copper acetylide, if formed.

Tent Heater

The tests made to evaluate performance of various fans for the gasoline tent heater were completed during this quarter. Performance of fan samples identified as JAN-1, 2 and 3 was measured, and in general required less horsepower/cfm than the standard sample. The amount of air delivered at the open-duct condition was less for the JAN 1-3 series than for the standard fan (sample 5).

Because of the possibility, during manufacture of the tent heaters, of having the fan blades mounted in various positions with relation the fan shroud, a series of tests was made to determine the effect of moving the fan in and out of the fan shroud. The fan position was altered by elongating the engine mounting holes in the base. A total change of position of 3/4" was obtained relative to the innermost position of the fan in the shroud. In general, this innermost position gave the lowest horsepower in relation to the air delivery but delivered less air at open-duct condition than at positions further out.

As part of the fan tests, calibrations were made of a set of field test ducts to determine air delivery vs. static pressure. These ducts are intended to be used to check air delivery of tent heaters in the field and in production.

Tests were made to determine the relative pressure drop in the air circuit of two competitive tent heaters, one manufactured by Herman Nelson Company, the other by The Silent Glow Oil Burner Corporation.

Summaries of the test results and preliminary performance curves for all of the tests have been furnished to the interested personnel of The Office of The Quartermaster General during the quarter.

Calorimeter

The secondary refrigerant calorimeter was checked out for proper operation preparatory to calorimeter tests of the small radial compressor submitted for tests by Longstreth Enterprises, La Jolla, California. This compressor is rated by its manufacturer at 1/2 HP 6000 Btu/hr capacity, but no operating conditions are specified. A series of tests of this compressor for a range of speeds and a range of compression ratios will be started immediately.

Hydraulic Drives

A preliminary investigation was made of certain aspects of the development of a hydraulic drive system for certain gasoline-engine-driven, portable refrigerating

units which now use belting, couplings, and other devices to transmit power to the various driven components. A proposal for this work has been submitted to [illegible].

Water Coolers

Tests on one electric drinking water cooler manufactured by Frigidaire Division of General Motors for the Chicago Quartermaster Depot to determine compliance with the performance requirements of Federal Specification 00-C-506b were completed. The cooler did not meet the thermostat requirement of the specification. A second thermostat, installed on the cooler by a representative of the manufacturer, did not comply with the requirements either; however, further tests were not made of this cooler. The report on this cooler, as well as two reports on tests of coolers previously done for the Chicago Quartermaster Depot, have been issued to the agency requesting the tests.